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Hashimoto et al.

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(54) **INFORMATION PROCESSING DEVICE, SETTING METHOD, AND COMPUTER PROGRAM PRODUCT**

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G06F 3/12 (2006.01)

(52) **U.S. Cl.**
CPC ***G06F 3/1241*** (2013.01); ***G06F 3/1204*** (2013.01); ***G06F 3/1256*** (2013.01); ***G06F 3/1285*** (2013.01)

(58) **Field of Classification Search**
USPC 358/1.15
See application file for complete search history.

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(57) **ABSTRACT**

An information processing device includes: an acquisition unit that acquires set values of chapters representing units into which an entire job is arbitrarily divided; an image generation unit that generates a setting image including the acquired set values of the chapters as one of options of a print setting; a display control unit that performs control to display the generated setting image on a display unit; and a ticket generation unit that generates a job ticket including a designated print setting based on the setting image displayed on the display unit.

12 Claims, 13 Drawing Sheets

Insert Position	Page Numbers	Before/ After	INSERTION POSITION (RESULT) EACH HYPHEN INDICATES BEFORE OR AFTER PAGE _PAGE, PAGE_
Input Page Number	1	After	1_
Input Page Number	1, 7, 13	Before	_1 , _7, _13 INSERTED BEFORE EACH OF INPUT PAGES SEPARATED WITH COMMAS
Input Page Number	1-10	Before	_1 , _2 , _3 , _4 , _5 , _6 , _7, _8 , _9 , _10
1-5	(Disable)	After	5_
1-5	(Disable)	Before	_1
All Chapters	(Disable)	Before	WHEN START PAGES OF CHAPTERS ARE DEFINED AS 1, 6, 10, SETTING IS 1-5, 6-9, 10-(LAST PAGE), SO THAT _1, _6, _10
All Chapters	(Disable)	After	WHEN START PAGES OF CHAPTERS ARE DEFINED AS 1, 6, 10, SETTING IS 1-5, 6-9, 10-(LAST PAGE), SO THAT 5_, 9_, (LAST PAGE)_

FIG.1

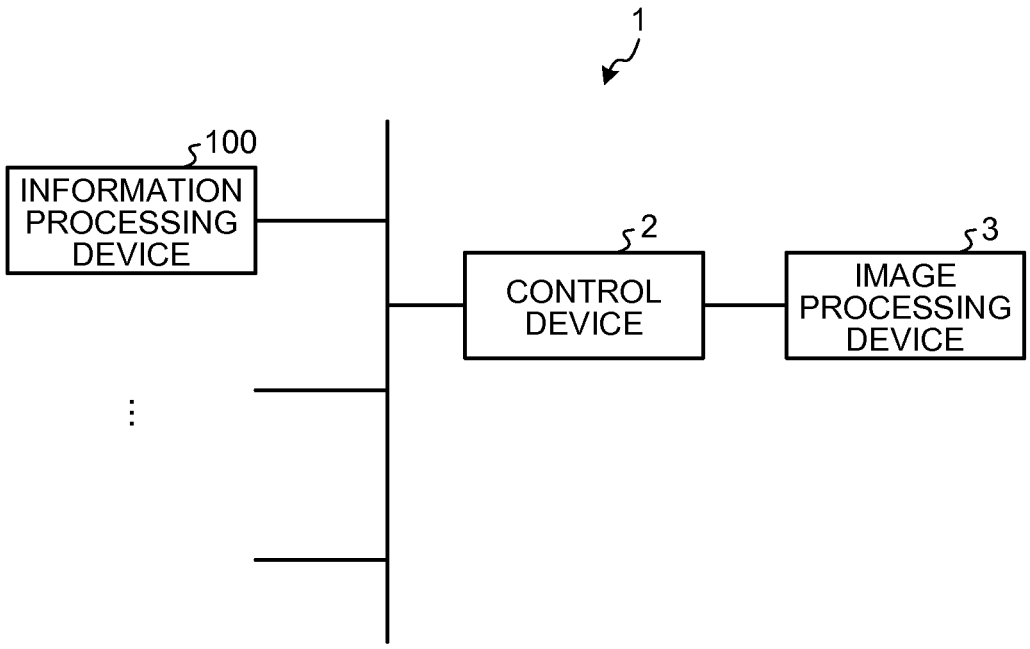

1
100
INFORMATION PROCESSING DEVICE
2
CONTROL DEVICE
3
IMAGE PROCESSING DEVICE

FIG.2

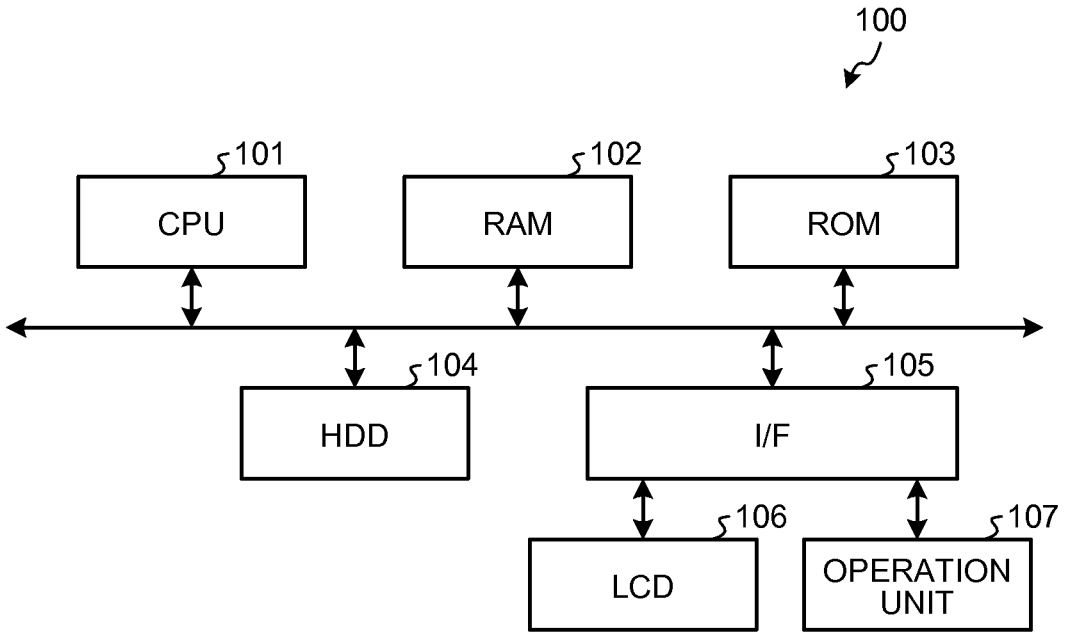

100
101
CPU
102
RAM
103
ROM
104
HDD
105
I/F
106
LCD
107
OPERATION UNIT

FIG.3

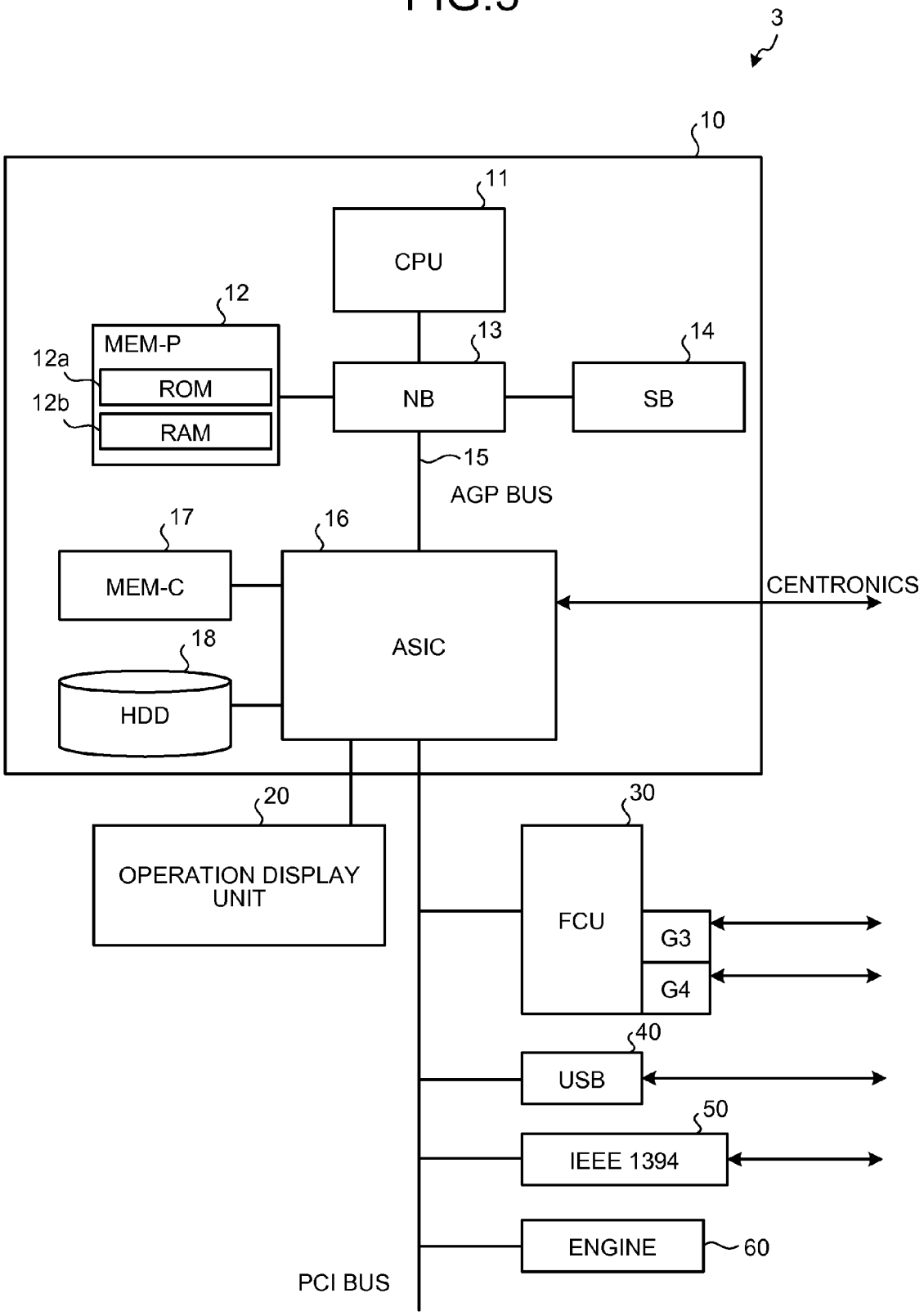

3
10
11
CPU
12
MEM-P
12a
ROM
12b
RAM
13
NB
14
SB
15
AGP BUS
17
MEM-C
16
ASIC
CENTRONICS
18
HDD
20
OPERATION DISPLAY UNIT
30
FCU
G3
G4
40
USB
50
IEEE 1394
ENGINE
60
PCI BUS

FIG.4

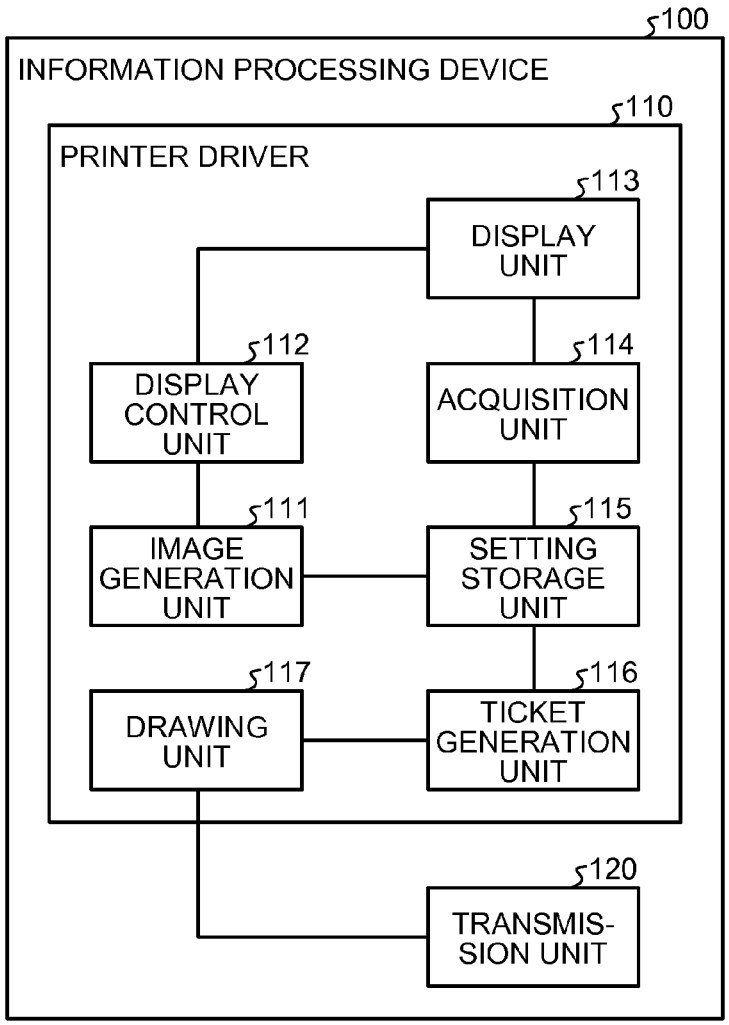

100
INFORMATION PROCESSING DEVICE
110
PRINTER DRIVER
113
DISPLAY UNIT
112
DISPLAY CONTROL UNIT
114
ACQUISITION UNIT
111
IMAGE GENERATION UNIT
115
SETTING STORAGE UNIT
117
DRAWING UNIT
116
TICKET GENERATION UNIT
120
TRANSMIS-SION UNIT

FIG.5

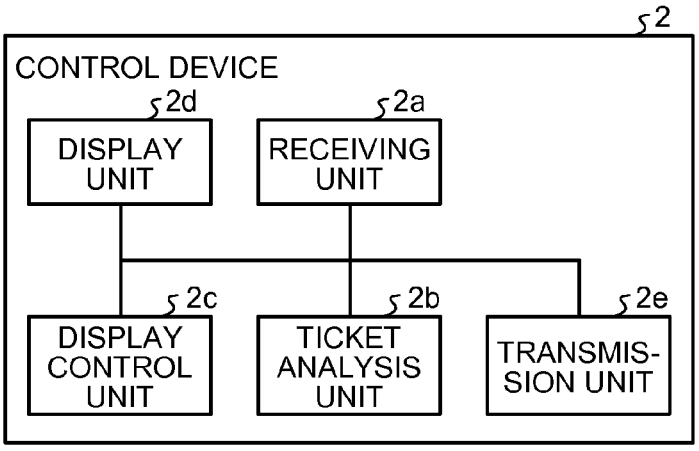

2
CONTROL DEVICE
2d
DISPLAY UNIT
2a
RECEIVING UNIT
2c
DISPLAY CONTROL UNIT
2b
TICKET ANALYSIS UNIT
2e
TRANSMIS-SION UNIT

FIG.6

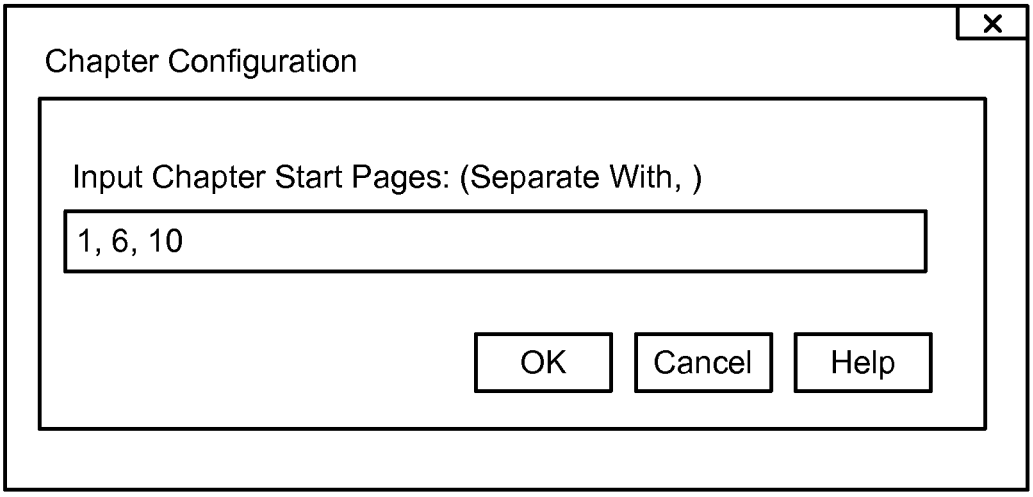

Chapter Configuration
Input Chapter Start Pages: (Separate With,)
1, 6, 10
OK
Cancel
Help

FIG.7

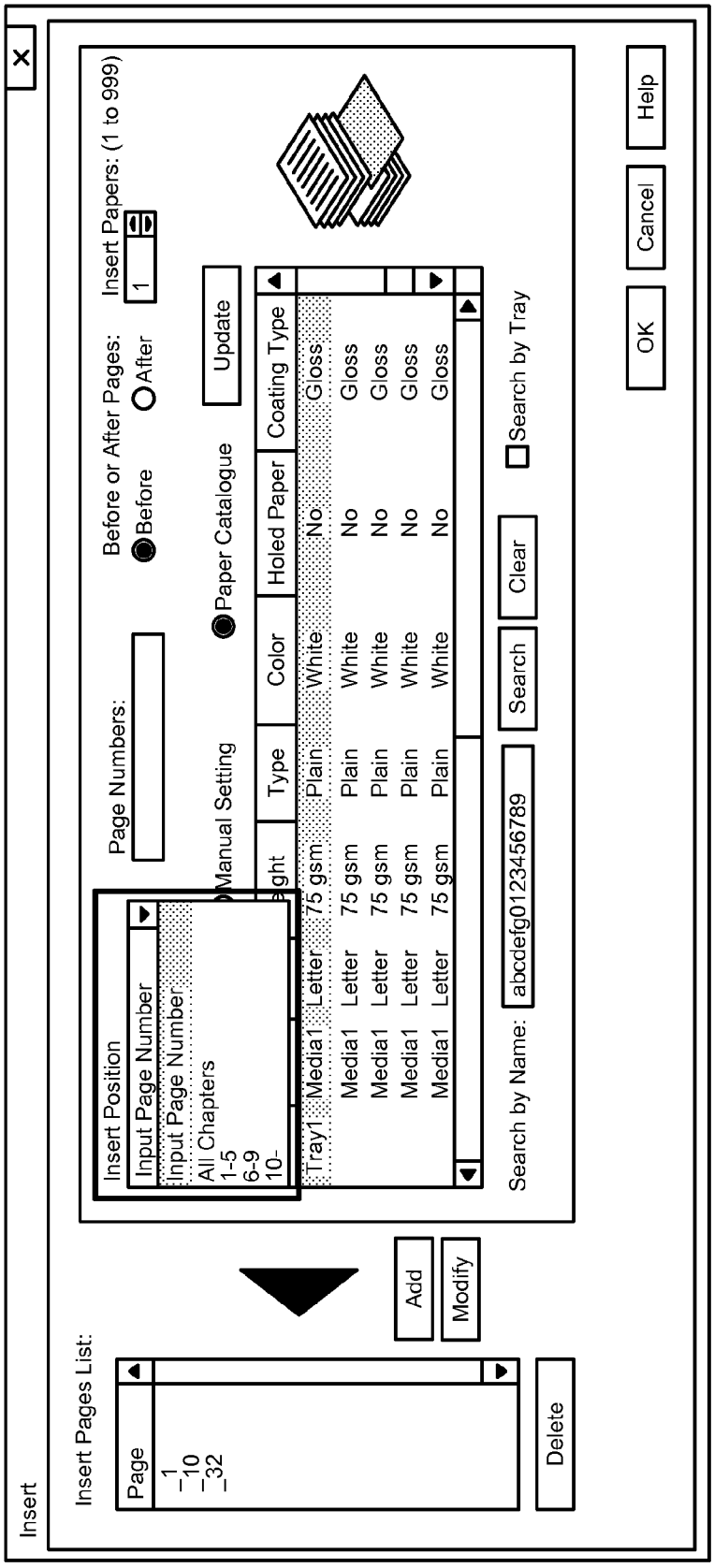

Insert
Insert Pages List:
Page
1
10
32
Delete
Add
Modify
Insert Position
Input Page Number
Input Page Number:
All Chapters
1-5
6-9
10-
Page Numbers:
Before or After Pages:
Before
After
Insert Papers: (1 to 999)
1
Manual Setting
Paper Catalogue
Update
ght
Type
Color
Holed Paper
Coating Type
Tray1 Media1 Letter 75 gsm Plain White No Gloss
Media1 Letter 75 gsm Plain White No Gloss
Media1 Letter 75 gsm Plain White No Gloss
Media1 Letter 75 gsm Plain White No Gloss
Media1 Letter 75 gsm Plain White No Gloss
Search by Name:
abcdefg0123456789
Search
Clear
Search by Tray
OK
Cancel
Help

FIG.8

Insert Position	Page Numbers	Before/ After	INSERTION POSITION (RESULT) EACH HYPHEN INDICATES BEFORE OR AFTER PAGE _PAGE, PAGE_
Input Page Number	1	After	1_
Input Page Number	1, 7, 13	Before	_1 , _7, _13 INSERTED BEFORE EACH OF INPUT PAGES SEPARATED WITH COMMAS
Input Page Number	1-10	Before	_1 , _2 , _3 , _4 , _5 , _6 , _7, _8 , _9 , _10
1-5	(Disable)	After	5_
1-5	(Disable)	Before	_1
All Chapters	(Disable)	Before	WHEN START PAGES OF CHAPTERS ARE DEFINED AS 1, 6, 10, SETTING IS 1-5, 6-9, 10-(LAST PAGE), SO THAT _1, _6, _10
All Chapters	(Disable)	After	WHEN START PAGES OF CHAPTERS ARE DEFINED AS 1, 6, 10, SETTING IS 1-5, 6-9, 10-(LAST PAGE), SO THAT 5_, 9_, (LAST PAGE)_

FIG.9

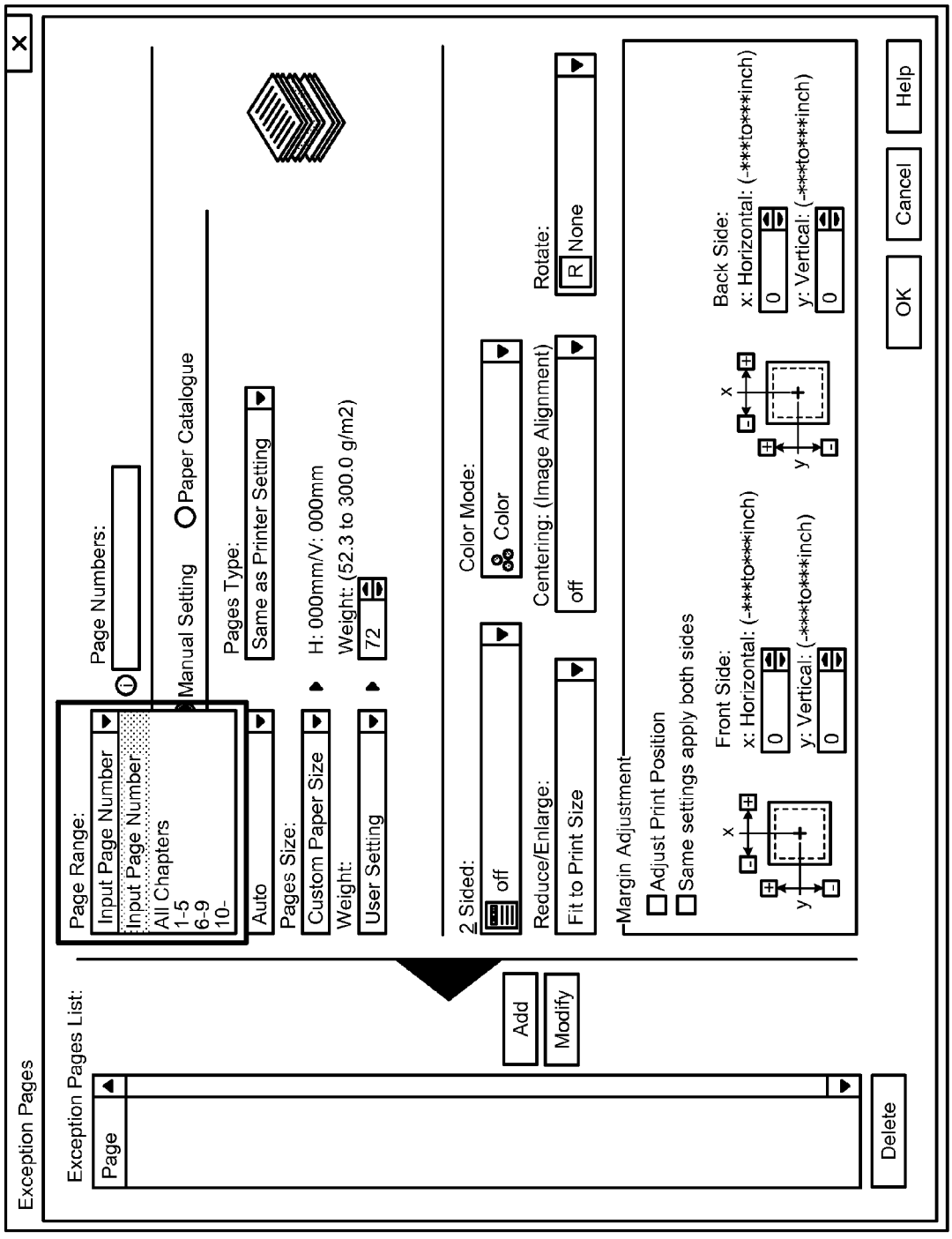

Exception Pages
Exception Pages List:
Page
Delete
Add
Modify
Page Range:
Input Page Number
Input Page Number
All Chapters
1-5
6-9
10-
Page Numbers:
Manual Setting
Paper Catalogue
Auto
Pages Type:
Same as Printer Setting
Pages Size:
Custom Paper Size
H: 000mm/V: 000mm
Weight:
User Setting
Weight: (52.3 to 300.0 g/m2)
72
2 Sided:
off
Color Mode:
Color
Reduce/Enlarge:
Fit to Print Size
Centering: (Image Alignment)
off
Rotate:
R None
Margin Adjustment
Adjust Print Position
Same settings apply both sides
Front Side:
x: Horizontal: (-***to***inch)
y: Vertical: (-***to***inch)
0
Back Side:
x: Horizontal: (-***to***inch)
y: Vertical: (-***to***inch)
OK
Cancel
Help

FIG.10

Page Range	Page Numbers	PAGE RANGE (RESULT)
Input Page Number	1	SETTING OF EXCEPTION PAGE IS APPLIED TO PAGE 1
Input Page Number	1, 7, 13	SETTING OF EXCEPTION PAGE IS APPLIED TO EACH OF PAGES 1, 7, AND 13
Input Page Number	1-10	SETTING OF EXCEPTION PAGE IS APPLIED TO PAGES 1 TO 10
1-5	(Disable)	SETTING OF EXCEPTION PAGE IS APPLIED TO PAGES 1 TO 5 (= FIRST CHAPTER)
All Chapters	(Disable)	WHEN CHAPTERS ARE DEFINED AS 1, 6, 10, SETTING IS 1-5, 6-9, 10-(LAST PAGE), SO THAT SETTING OF EXCEPTION PAGE IS APPLIED TO 1-5, 6-9, 10-(LAST PAGE) (= FIRST CHAPTER, SECOND CHAPTER, AND THIRD CHAPTER)

FIG.11

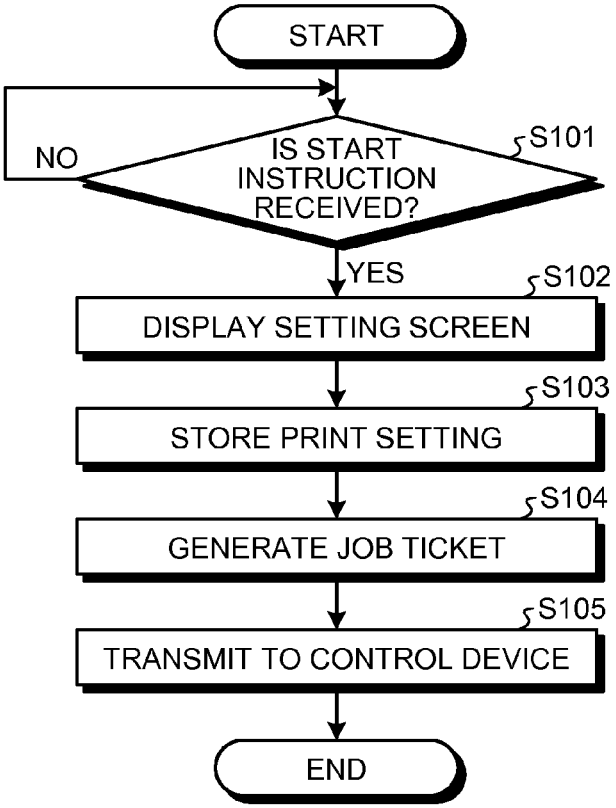


FIG.12

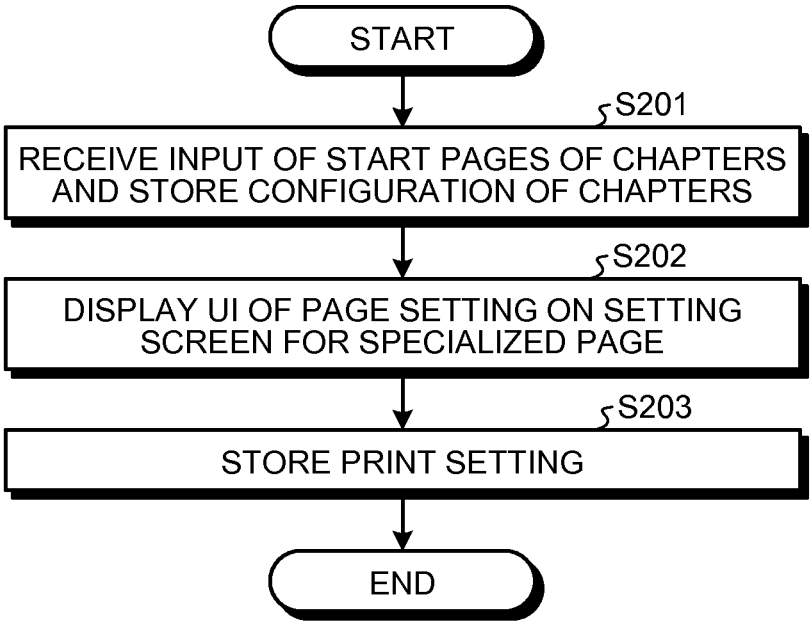

START
S201
RECEIVE INPUT OF START PAGES OF CHAPTERS AND STORE CONFIGURATION OF CHAPTERS
S202
DISPLAY UI OF PAGE SETTING ON SETTING SCREEN FOR SPECIALIZED PAGE
S203
STORE PRINT SETTING
END

FIG.13

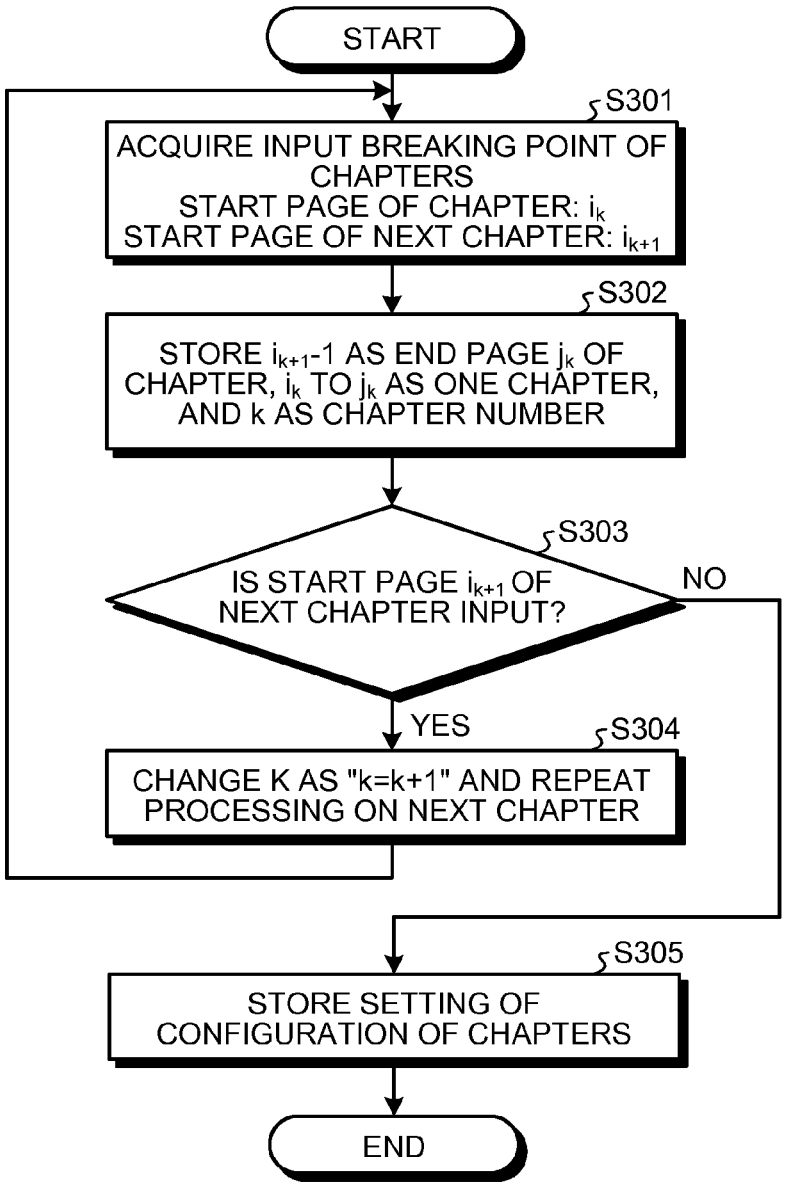


FIG.14

CHAPTER NUMBER	START PAGE	LAST PAGE
1	1	5
2	6	9
...	...	...

FIG.15

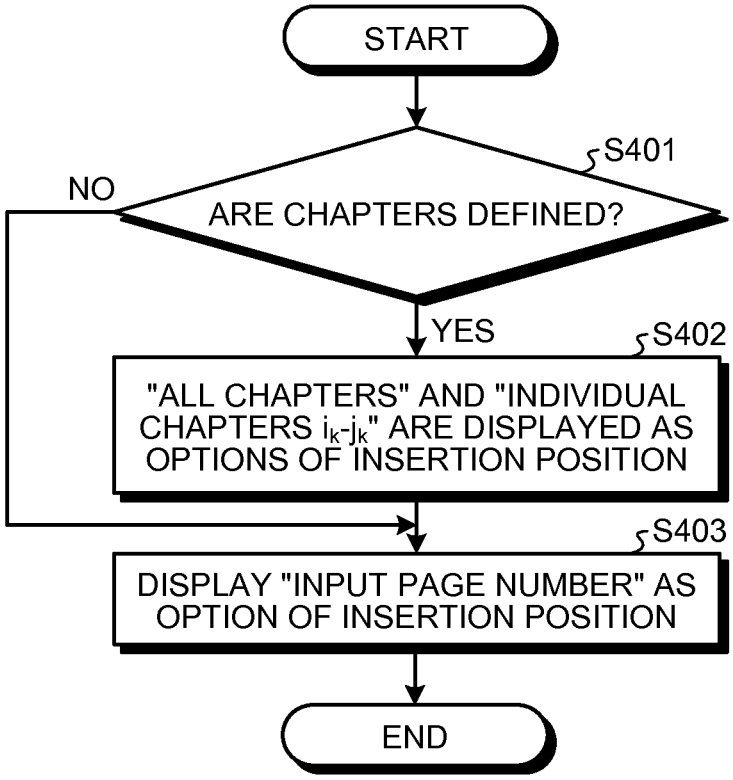

START
S401
ARE CHAPTERS DEFINED?
NO
YES
S402
"ALL CHAPTERS" AND "INDIVIDUAL CHAPTERS i_k-j_k" ARE DISPLAYED AS OPTIONS OF INSERTION POSITION
S403
DISPLAY "INPUT PAGE NUMBER" AS OPTION OF INSERTION POSITION
END

FIG.16

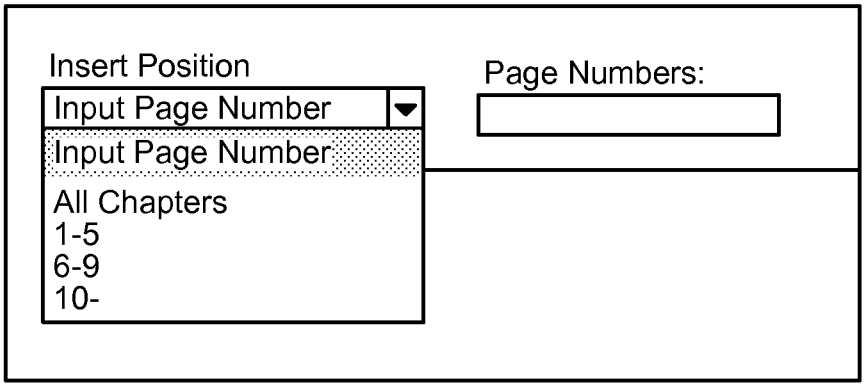

Insert Position
Input Page Number
Input Page Number
All Chapters
1-5
6-9
10-
Page Numbers:

FIG.17

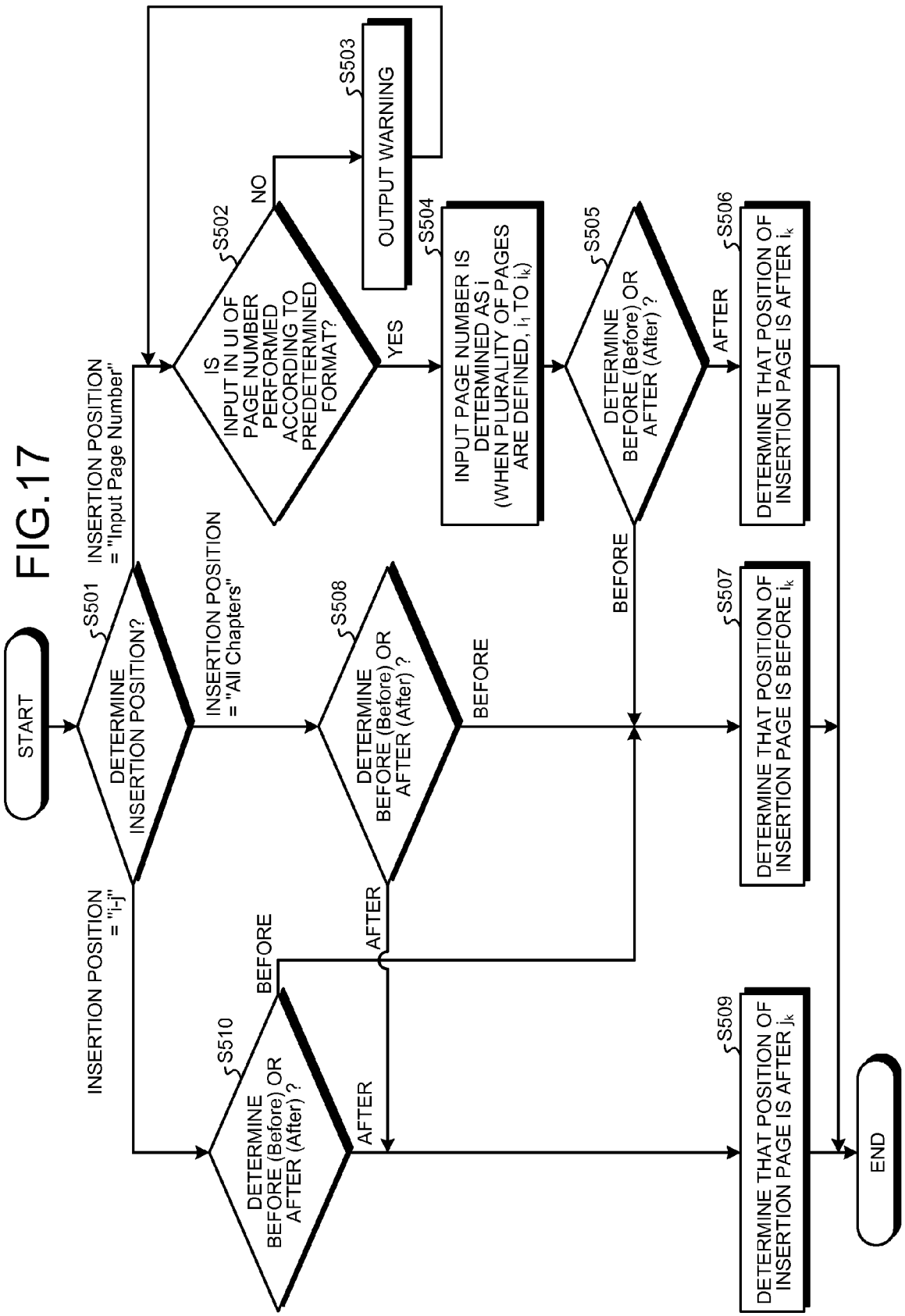
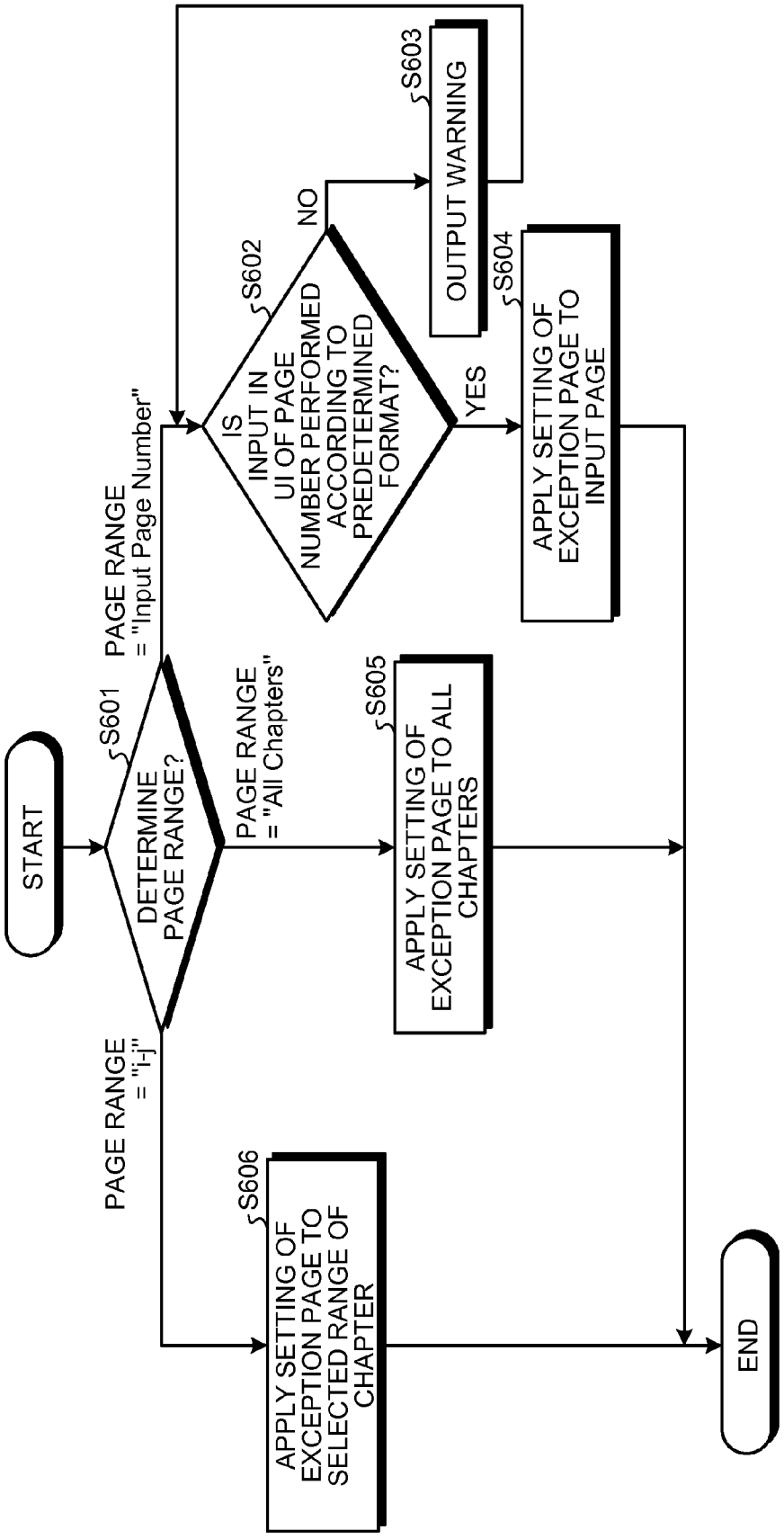

START
S501
DETERMINE INSERTION POSITION?
INSERTION POSITION = "Input Page Number"
INSERTION POSITION = "All Chapters"
INSERTION POSITION = "i-j"
S502
IS INPUT IN UI OF PAGE NUMBER PERFORMED ACCORDING TO PREDETERMINED FORMAT?
NO
YES
S503
OUTPUT WARNING
S504
INPUT PAGE NUMBER IS DETERMINED AS i (WHEN PLURALITY OF PAGES ARE DEFINED, i_1 TO i_k)
S505
DETERMINE BEFORE (Before) OR AFTER (After) ?
AFTER
BEFORE
S506
DETERMINE THAT POSITION OF INSERTION PAGE IS AFTER i_k
S507
DETERMINE THAT POSITION OF INSERTION PAGE IS BEFORE i_k
S508
DETERMINE BEFORE (Before) OR AFTER (After) ?
BEFORE
AFTER
S509
DETERMINE THAT POSITION OF INSERTION PAGE IS AFTER j_k
S510
DETERMINE BEFORE (Before) OR AFTER (After) ?
BEFORE
AFTER
END

FIG.18


START
S601
DETERMINE PAGE RANGE?
PAGE RANGE = "Input Page Number"
PAGE RANGE = "All Chapters"
PAGE RANGE = "i-j"
S602
IS INPUT IN UI OF PAGE NUMBER PERFORMED ACCORDING TO PREDETERMINED FORMAT?
NO
YES
S603
OUTPUT WARNING
S604
APPLY SETTING OF EXCEPTION PAGE TO INPUT PAGE
S605
APPLY SETTING OF EXCEPTION PAGE TO ALL CHAPTERS
S606
APPLY SETTING OF EXCEPTION PAGE TO SELECTED RANGE OF CHAPTER
END

INFORMATION PROCESSING DEVICE, SETTING METHOD, AND COMPUTER PROGRAM PRODUCT

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application claims priority to and incorporates by reference the entire contents of Japanese Patent Application No. 2013-254520 filed in Japan on Dec. 9, 2013.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an information processing device, a setting method, and a computer program product.

2. Description of the Related Art

In production printing industry, a printing output itself may be a product in many cases. Accordingly, printers for production are desired to output high-value-added printed matter in which a printing media type or a print setting is different for each page, instead of simple printed matter such as conventional office printing. Examples of a technique for implementing the print setting different for each page include a function called a specialized page.

For example, types of the function of the specialized page include an insertion page and an exception page. Among these, the insertion page is a function for newly inserting a page different from a job into a designated position. The exception page is a function for applying a print setting different from the job to a designated page range. That is, with the exception page, a set value different from the job can be applied to a sheet setting, a postprocessing setting, a color/monochrome setting, and/or the like.

As the technique for setting the specialized page as described above, there is a technique for applying a setting of exception page without opening a setting screen for the exception page by performing a predetermined operation in a setting screen for the entire document.

Conventional techniques are described in Japanese Patent No. 4817986 and Japanese Patent Application Laid-open No. 2013-012033 for example.

However, in the related art described above, a burden on a user increases in print setting. In the print setting, there is a concept of "chapters" representing units into which the entire job is arbitrarily divided. The chapters are a function for designating pages to be breaking points. In the related art described above, to define a configuration of chapters and further set the exception page and the insertion page in association with the chapters, the user should memorize ranges of the chapters. As a result, in the related art, the burden on the user increases in print setting.

In view of the above, there is a need to provide an information processing device, a setting method, and a computer program product that can reduce the burden on the user in print setting.

SUMMARY OF THE INVENTION

It is an object of the present invention to at least partially solve the problems in the conventional technology.

An information processing device includes: an acquisition unit that acquires set values of chapters representing units into which an entire job is arbitrarily divided; an image generation unit that generates a setting image including the acquired set values of the chapters as one of options of a print setting; a display control unit that performs control to display the generated setting image on a display unit; and a ticket generation unit that generates a job ticket including a designated print setting based on the setting image displayed on the display unit.

A setting method includes: acquiring set values of chapters representing units into which an entire job is arbitrarily divided; generating a setting image including the acquired set values of the chapters as one of options of a print setting; performing control to display the generated setting image on a display unit; and generating a job ticket including a designated print setting based on the setting image displayed on the display unit.

A computer program product includes a non-transitory computer-readable medium containing an information processing program. The program causes a computer to perform: acquiring set values of chapters representing units into which an entire job is arbitrarily divided; generating a setting image including the acquired set values of the chapters as one of options of a print setting; performing control to display the generated setting image on a display unit; and generating a job ticket including a designated print setting based on the setting image displayed on the display unit.

The above and other objects, features, advantages and technical and industrial significance of this invention will be better understood by reading the following detailed description of presently preferred embodiments of the invention, when considered in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a diagram illustrating a system configuration example of a printing system according to a first embodiment of the present invention;

FIG. **2** is a block diagram illustrating a hardware configuration example of an information processing device according to the first embodiment;

FIG. **3** is a block diagram illustrating a hardware configuration example of an image processing device according to the first embodiment;

FIG. **4** is a block diagram illustrating a functional configuration example of the information processing device according to the first embodiment;

FIG. **5** is a block diagram illustrating a functional configuration example of a control device according to the first embodiment;

FIG. **6** is a diagram illustrating an example of a setting image for defining a configuration of chapters;

FIG. **7** is a diagram illustrating an example of a setting image for setting an insertion page;

FIG. **8** is a diagram for explaining an example of an insertion position corresponding to a set value set in the setting image for setting the insertion page;

FIG. **9** is a diagram illustrating an example of the setting image for setting an exception page;

FIG. **10** is a diagram for explaining an example of a page range corresponding to the set value set in the setting image for setting the exception page;

FIG. **11** is a flowchart illustrating an example of a procedure of print instruction transmission processing according to the first embodiment;

FIG. **12** is a flowchart illustrating an example of a procedure of definition processing on the configuration of the chapters and print setting processing on a specialized page according to the first embodiment;

FIG. **13** is a flowchart illustrating an example of a detailed procedure of the definition processing on the configuration of the chapters according to the first embodiment;

FIG. **14** is a diagram illustrating a data configuration example of the chapters;

FIG. **15** is a flowchart illustrating an example of a detailed procedure of setting processing on the specialized page according to the first embodiment;

FIG. **16** is a diagram illustrating an example of a UI for designating an insertion position of the specialized page;

FIG. **17** is a flowchart illustrating an example of a procedure of insertion position setting processing according to the first embodiment; and

FIG. **18** is a flowchart illustrating an example of a procedure of page range setting processing according to the first embodiment.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The following describes embodiments of an information processing device, a setting method, and a computer program product according to the present invention with reference to the attached drawings. However, the present invention is not limited to the embodiments described below.

First Embodiment

System Configuration

The following describes a system configuration of a printing system according to a first embodiment with reference to FIG. **1**. FIG. **1** is a diagram illustrating a system configuration example of the printing system according to the first embodiment.

As illustrated in FIG. **1**, a printing system **1** includes an information processing device **100**, a control device **2**, and an image processing device **3**. The information processing device **100**, the control device **2**, and the image processing device **3** are connected to a network such as a local area network (LAN) and the Internet. A plurality of information processing devices **100**, control devices **2**, and image processing devices **3** may be connected to the network.

A user performs print setting using the information processing device **100**. Accordingly, the information processing device **100** generates a job ticket including the print setting, and transmits the generated job ticket to the control device **2** via the network. The control device **2** receives the job ticket transmitted by the information processing device **100**, and interprets the received job ticket to output a printing command to the image processing device **3**. The image processing device **3** then performs printing processing according to the printing command output from the control device **2**. The image processing device **3** may be a multifunction peripheral having at least two functions including a printing function among the printing function, a copying function, a scanner function, and a facsimile function.

Hardware Configuration

Next, the following describes hardware configurations of the information processing device **100**, the control device **2**, and the image processing device **3** according to the first embodiment with reference to FIG. **2** and FIG. **3**. The hardware configurations of the information processing device **100** and the control device **2** are the same, so that the hardware configuration of the information processing device **100** will be described with reference to FIG. **2**.

FIG. **2** is a block diagram illustrating a hardware configuration example of the information processing device **100** according to the first embodiment. As illustrated in FIG. **2**, the information processing device **100** includes a central processing unit (CPU) **101**, a random access memory (RAM) **102**, a read only memory (ROM) **103**, a hard disk drive (HDD) **104**, an interface (I/F) **105**, a liquid crystal display (LCD) **106**, and an operation unit **107** that are connected to a bus.

The CPU **101** controls the entire operation of the information processing device **100**. For example, the CPU **101** executes a computer program stored in the ROM **103**, the HDD **104** or the like using the RAM **102** as a work area (working space) to control the entire operation of the information processing device **100**. The RAM **102** is a volatile storage medium that can read and write information at high speed. For example, the RAM **102** is utilized as a work area (working space) when the CPU **101** performs processing. The ROM **103** is a read-only non-volatile storage medium. For example, the ROM **103** stores therein a computer program such as firmware.

The HDD **104** is a non-volatile storage medium that can read and write information. For example, the HDD **104** stores therein an operating system (OS), various control programs, an application program, and/or the like. The I/F **105** connects the bus with various pieces of hardware or networks and controls them. The LCD **106** is a visual user interface (UI) for displaying and outputting various pieces of information. The operation unit **107** is a UI such as a keyboard or a mouse for inputting various pieces of information.

FIG. **3** is a block diagram illustrating a hardware configuration example of the image processing device **3** according to the first embodiment. As illustrated in FIG. **3**, the image processing device **3** has a configuration in which a controller **10** and an engine unit (Engine) **60** are connected with each other using a peripheral component interface (PCI) bus. The controller **10** is a controller that controls the entire image processing device **3**, drawing, communication, and an input from an operation unit (not illustrated). The engine unit **60** is a printer engine or the like that can be connected to the PCI bus, such as a black-and-white plotter, a one-drum color plotter, a four-drum color plotter, a scanner, or a fax unit. The engine unit **60** includes an image processing part for error expansion, gamma conversion, and/or the like in addition to what is called an engine part such as a plotter.

The controller **10** includes a CPU **11**, a Northbridge (NB) **13**, a system memory (MEM-P) **12**, a Southbridge (SB) **14**, a local memory (MEM-C) **17**, an application specific integrated circuit (ASIC) **16**, and a hard disk drive (HDD) **18**. The Northbridge **13** and the ASIC **16** are connected with each other via an accelerated graphics port (AGP) bus **15**. The MEM-P **12** includes a read only memory (ROM) **12***a* and a random access memory (RAM) **12***b*.

The CPU **11** controls the entire image processing device **3**, and includes a chipset including the Northbridge **13**, the MEM-P **12**, and the Southbridge **14** to be connected to another device via the chipset.

The Northbridge **13** is a bridge for connecting the CPU **11** with the MEM-P **12**, the Southbridge **14**, and the AGP bus **15**, and includes a memory controller that controls reading/writing with respect to the MEM-P **12**, a PCI master, and an AGP target.

The MEM-P **12** is a system memory used as a memory for storing a computer program or data, a memory for expanding a computer program or data, a memory for drawing of a printer, and/or the like, and includes the ROM **12***a* and the RAM **12***b*. The ROM **12***a* is a read-only memory used as the

memory for storing a computer program or data, and the RAM **12***b* is a writable and readable memory used as the memory for expanding a computer program or data, the memory for drawing of a printer, and/or the like.

The Southbridge **14** is a bridge for connecting the Northbridge **13** with a PCI device and a peripheral device. The Southbridge **14** is connected with the Northbridge **13** via the PCI bus. A network interface (I/F) unit and the like are also connected to the PCI bus.

The ASIC **16** is an integrated circuit (IC) for image processing use including a hardware element for image processing, and functions as a bridge for connecting the AGP bus **15**, the PCI bus, the HDD **18**, and the MEM-C **17**. The ASIC **16** includes a PCI target, an AGP master, an arbiter (ARB) being the core of the ASIC **16**, a memory controller that controls the MEM-C **17**, a plurality of direct memory access controllers (DMACs) that rotates image data using hardware logic or the like, and is connected with the engine unit **60**, a facsimile control unit (FCU) **30**, a universal serial bus (USB) **40**, and the Institute of Electrical and Electronics Engineers **1394** (IEEE1394) interface **50** via the PCI bus. An operation display unit **20** is directly connected to the ASIC **16**.

The MEM-C **17** is a local memory used as an image buffer for copying and a code buffer. The hard disk drive (HDD) **18** is a storage for accumulating image data, a computer program, font data, and a form.

The AGP bus **15** is a bus interface for a graphics accelerator card that is proposed for accelerating graphic processing. The AGP bus **15** accelerates the graphics accelerator card by directly accessing the MEM-P **12** with high throughput.

Functional Configuration

Next, the following describes a functional configuration of the device according to the first embodiment with reference to FIG. **4** and FIG. **5**. FIG. **4** is a block diagram illustrating a functional configuration example of the information processing device **100** according to the first embodiment.

As illustrated in FIG. **4**, the information processing device **100** includes a printer driver **110** and a transmission unit **120**. Among these, the printer driver **110** includes an image generation unit **111**, a display control unit **112**, a display unit **113**, an acquisition unit **114**, a setting storage unit **115**, a ticket generation unit **116**, and a drawing unit **117**. Part or all of the components described above may be made with software (computer program) or a hardware circuit.

The image generation unit **111** generates various images to be displayed on the display unit **113**. More specifically, the image generation unit **111** generates a setting image when the user performs an operation for performing print setting in executing an application such as document preparation. For example, the setting image includes an image for performing typical print setting, an image for performing print setting for a specialized page such as an insertion page, an exception page, and a tab for utilizing a sheet different from the entire page as a partition, an image for setting chapters, and the like. The chapters represent units into which the entire job is arbitrarily divided. When set values of the chapters are stored in the setting storage unit **115** described later, the image generation unit **111** generates a setting image including the set values as one of options of the print setting. The image generation unit **111** then outputs the generated setting image to the display control unit **112**.

The display control unit **112** performs control to display an image on the display unit **113**. More specifically, the display control unit **112** performs control to display the setting image output from the image generation unit **111** on the display unit **113**. The display unit **113** is a display for displaying various images. For example, the display unit **113** displays the setting image for performing print setting due to the control by the display control unit **112**.

FIG. **6** is a diagram illustrating an example of the setting image for defining the configuration of the chapters. As illustrated in FIG. **6**, in the setting image for defining the configuration of the chapters, the configuration of the chapters can be defined by inputting start pages of the chapters separated with a comma or the like. For example, when "1, 6, 10" are input, three chapters are defined including a chapter of pages 1 to 5, a chapter of pages 6 to 9, and a chapter of pages 10 to the last. As described above, when the configuration of the chapters is defined, ranges of the chapters are displayed as options of page ranges in the setting image of the specialized page. The user can select the range of the chapter from options and easily perform setting on the range of the chapter.

FIG. **7** is a diagram illustrating an example of the setting image for setting the insertion page. As illustrated in FIG. **7**, in the setting image for setting the insertion page, an insertion position can be determined based on "Insert Position", "Page Numbers", and "Before or After Pages". "Insert Position" includes options corresponding to the configuration of the chapters defined in advance in the setting image illustrated in FIG. **6** or the like. In the example illustrated in FIG. **7**, "1-5", "6-9", and "10-" correspond to the options corresponding to the configuration of the chapters. When "Input Page Number" is selected from the options of "Insert Position", "Page Numbers" can be designated. When "All Chapters" is selected from the options of "Insert Position", the insertion position can be set to all the chapters defined in advance. At "Before or After Pages", the insertion position can be set before or after the designated page by selecting "Before" or "After".

FIG. **8** is a diagram for explaining an example of the insertion position corresponding to the set value set in the setting image for setting the insertion page. FIG. **8** exemplifies a case in which "1, 6, 10" are input in defining the configuration of the chapters as illustrated in FIG. **6**. For example, as illustrated in FIG. **8**, when "Input Page Number" is selected from the options of "Insert Position", "1" is input to "Page Numbers", and "After" is selected in "Before or After Pages (Before/After)", the insertion position is after page 1 (1_). When "1-5" corresponding to the configuration of the chapters is selected from the options of "Insert Position" and "After" is selected in "Before or After Pages (Before/After)", the insertion position is after page 5 (5_). When "All Chapters" is selected from the options of "Insert Position" and "Before" is selected in "Before or After Pages (Before/After)", the insertion positions are before page 1 (_1), before page 6 (_6), and before page 10 (_10).

FIG. **9** is a diagram illustrating an example of the setting image for setting the exception page. As illustrated in FIG. **9**, in the setting image for setting the exception page, the page range can be determined based on "Page Range" and "Page Numbers". "Page Range" includes the options corresponding to the configuration of the chapters defined in advance in the setting image illustrated in FIG. **6** or the like. In the example illustrated in FIG. **9**, "1-5", "6-9", and "10-" correspond to the options corresponding to the configuration of the chapters. When "Input Page Number" is selected from the options of "Page Range", "Page Numbers" can be designated. When "All Chapters" is selected from the options of "Page Range", the exception page can be set to all the chapters defined in advance.

FIG. **10** is a diagram for explaining an example of the page range corresponding to the set value set in the setting image for setting the exception page. FIG. **10** exemplifies a case in which "1, 6, 10" are input in defining the configuration of the chapters as illustrated in FIG. **6**. For example, as illustrated in FIG. **10**, when "Input Page Number" is selected from the options of "Page Range" and "1" is input to "Page Numbers", the setting of exception page is applied to page 1. When "1-5" corresponding to the configuration of the chapters is selected from the options of "Page Range", the setting of exception page is applied to pages 1 to 5 being the first chapter. When "All Chapters" is selected from the options of "Page Range", the setting of exception page is applied to pages 1 to 5 being the first chapter, pages 6 to 9 being the second chapter, and pages 10 to the last being the third chapter.

Returning back to FIG. **4**, the acquisition unit **114** acquires the set value related to the print setting. More specifically, the acquisition unit **114** acquires the set value designated by the user operation based on the setting image of the print setting displayed on the display unit **113**. For example, the set values acquired by the acquisition unit **114** include set values related to the configuration of the chapters. The acquisition unit **114** then stores the acquired set value in the setting storage unit **115**. The setting storage unit **115** stores the set value related to the print setting. For example, the setting storage unit **115** stores various print settings designated by the user including the set values related to the configuration of the chapters or the like.

The ticket generation unit **116** generates a job ticket. More specifically, the ticket generation unit **116** generates the job ticket reflecting the various print settings stored in the setting storage unit **115**. The job ticket is a job ticket for causing the image processing device **3** to perform printing. The drawing unit **117** generates page description language (PDL) data that can be interpreted by the image processing device **3**. More specifically, the drawing unit **117** generates the PDL data that can be interpreted by the image processing device **3**, and outputs the generated PDL data to the transmission unit **120** together with the job ticket generated by the ticket generation unit **116**. The transmission unit **120** communicates with an external device and transmits various pieces of information. For example, the transmission unit **120** transmits the PDL data or the job ticket output from the drawing unit **117** to the control device **2**.

FIG. **5** is a block diagram illustrating a functional configuration example of the control device **2** according to the first embodiment. As illustrated in FIG. **5**, the control device **2** includes a receiving unit **2***a*, a ticket analysis unit **2***b*, a display control unit **2***c*, a display unit **2***d*, and a transmission unit **2***e*. Part or all of the components described above may be made with software (computer program) or a hardware circuit.

The receiving unit **2***a* communicates with an external device and receives various pieces of information. More specifically, the receiving unit **2***a* receives the PDL data or the job ticket transmitted by the information processing device **100**. The ticket analysis unit **2***b* analyzes the job ticket. More specifically, the ticket analysis unit **2***b* analyzes content of the job ticket received by the receiving unit **2***a* and reads the print setting.

The display control unit **2***c* performs control to display an image on the display unit **2***d*. More specifically, the display control unit **2***c* generates an image for displaying print data as a job, an image for preview display according to the PDL data and the print setting read by the ticket analysis unit **2***b*, and/or the like, and performs control to display the generated images on the display unit **2***d*. The display unit **2***d* is a display for displaying various images. For example, the display unit **2***d* displays the print data as a job or performs preview display for printing under the control of the display control unit **2***c*. The transmission unit **2***e* communicates with an external device and transmits various pieces of information. For example, the transmission unit **2***e* transmits the print data to the image processing device **3**.

Procedure of Print Instruction Transmission Processing

Next, the following describes a procedure of print instruction transmission processing according to the first embodiment with reference to FIG. **11**. FIG. **11** is a flowchart illustrating an example of the procedure of print instruction transmission processing according to the first embodiment. The print instruction transmission processing mainly indicates processing by the information processing device **100** (printer driver **110**).

As illustrated in FIG. **11**, when the printer driver **110** receives a start instruction for a screen for performing print setting (Yes at Step S**101**), the display unit **113** displays the setting image generated by the image generation unit **111** according to the control by the display control unit **112** (Step S**102**). On the other hand, when the start instruction for performing print setting is not received (No at Step S**101**), the printer driver **110** is in a state of waiting for the start instruction.

The acquisition unit **114** acquires the set value designated by the user operation based on the setting image displayed on the display unit **113**, and stores the set value of the print setting in the setting storage unit **115** (Step S**103**). The ticket generation unit **116** generates the job ticket reflecting the set values of various print settings stored in the setting storage unit **115** (Step S**104**). The drawing unit **117** generates the PDL data that can be interpreted by the image processing device **3**, and transmits the PDL data or the job ticket to the control device **2** via the transmission unit **120** (Step S**105**).

Processing Procedure According to Configuration of Chapters and Print Setting

Next, the following describes a procedure of definition processing on the configuration of the chapters and print setting processing on the specialized page according to the first embodiment with reference to FIG. **12**. FIG. **12** is a flowchart illustrating an example of the procedure of the definition processing on the configuration of the chapters and the print setting processing on the specialized page according to the first embodiment. The flowchart illustrated in FIG. **12** represents details about the processing at Step S**102** and Step S**103** illustrated in FIG. **11**.

As illustrated in FIG. **12**, the acquisition unit **114** receives an input of the start pages of the chapters designated by the user operation based on the setting image for defining the configuration of the chapters displayed on the display unit **113**, and stores the input in the setting storage unit **115** (Step S**201**). For example, in the user operation, the user performs an operation of inputting start pages of the chapters separated with a comma or the like.

The user then performs a user operation to open the setting screen for printing the specialized page. Accordingly, the image generation unit **111** generates the setting image for performing print setting for the specialized page. The setting image includes the options related to the configuration of the chapters stored in the setting storage unit **115**. Subsequently, the display unit **113** displays the setting image generated by the image generation unit **111** according to the control by the display control unit **112** (Step S**202**).

The user performs the print setting for the specialized page based on the setting image displayed on the display unit

113. The acquisition unit **114** acquires the set value of the print setting designated by the user operation based on the setting image displayed on the display unit **113**, and stores the set value in the setting storage unit **115** (Step S**203**). Regarding the insertion page among the specialized page, a sheet can be selected. Regarding the exception page, a sheet setting, a color/monochrome setting, rotation, print position adjustment, imposition, duplex/simplex printing, magnification/reduction, and/or the like can be set.

Detailed Procedure of Definition Processing on Configuration of Chapters

Next, the following describes a detailed procedure of definition processing on the configuration of the chapters according to the first embodiment with reference to FIG. **13**. FIG. **13** is a flowchart illustrating an example of the detailed procedure of the definition processing on the configuration of the chapters according to the first embodiment. The flowchart illustrated in FIG. **13** represents details about the processing at Step S**201** illustrated in FIG. **12**.

As illustrated in FIG. **13**, the acquisition unit **114** acquires a breaking point of the chapters (for example, comma separation) designated by the user operation based on the setting image for defining the configuration of the chapters displayed on the display unit **113** (Step S**301**). Herein, the start page of the chapter is assumed to be "i_k", and the start page of the next chapter is assumed to be "i_{k+1}". The acquisition unit **114** then stores "$i_{k+1}-1$" as the end page of the chapter "j_k", "i_k" to "j_k" as one chapter, and "k" as a chapter number thereof, in the setting storage unit **115** (Step S**302**).

The acquisition unit **114** then determines whether the start page "i_{k+1}" of the next chapter is input (Step S**303**). In this case, if the start page "i_{k+1}" of the next chapter is input (Yes at Step S**303**), the acquisition unit **114** changes k as "k=k+1" and repeats the above processing on the next chapter (Step S**304**). On the other hand, if the start page "i_{k+1}" of the next chapter is not input (No at Step S**303**), the acquisition unit **114** stores the set values of the configuration of the chapters in the setting storage unit **115** because the processing has been performed on the set values of the configuration of all the chapters (Step S**305**).

FIG. **14** is a diagram illustrating a data configuration example of the chapters. For example, as illustrated in FIG. **14**, when "1, 6, 10" are input in defining the configuration of the chapters, the setting storage unit **115** stores "1" as the start page and "5" as the end page of the first chapter, "6" as the start page and "9" as the end page of the second chapter, "10" as the start page of the third chapter, and the final page of an original as the end page of the third chapter. As described above, "i_k" as the start pages and "j_k" as the end pages are held as page information of the chapters. The chapter number of the first chapter is held as "1", and the chapter number of the second chapter is held as "2", and so on.

Detailed Procedure of Setting Processing on Specialized Page

Next, the following describes a detailed procedure of setting processing on the specialized page according to the first embodiment with reference to FIG. **15**. FIG. **15** is a flowchart illustrating an example of the detailed procedure of the setting processing on the specialized page according to the first embodiment. The flowchart illustrated in FIG. **15** represents details about the processing at Step S**202** illustrated in FIG. **12**.

As illustrated in FIG. **15**, if the setting storage unit **115** stores the definition of the chapters (Yes at Step S**401**), the image generation unit **111** generates the setting image including "All Chapters" and individual chapters "i_k-j_k" as the options of the insertion position. The display control unit **112** then displays the setting image generated by the image generation unit **111** on the display unit **113** (Step S**402**). The image generation unit **111** also generates the setting image including "Input Page Number" as the option of the insertion position. The display control unit **112** displays the setting image generated by the image generation unit **111** on the display unit **113** (Step S**403**). That is, if there is the definition of the chapters, the options are displayed including "All Chapters", "Input Page Number", and the defined chapters.

On the other hand, if the setting storage unit **115** does not store the definition of the chapters (No at Step S**401**), the image generation unit **111** generates the setting image including "Input Page Number" as the option of the insertion position. The display control unit **112** then displays the setting image generated by the image generation unit **111** on the display unit **113** (Step S**403**). That is, if there is no definition of the chapters, the option including only "Input Page Number" is displayed.

FIG. **16** is a diagram illustrating an example of a UI for designating the insertion position of the specialized page. As illustrated in FIG. **16**, when "Input Page Number" is selected, an arbitrary page can be input in "Page Numbers". In such an input, not only a single page but a plurality of pages can be designated by separating with a comma or the like, or a page range can be designated with a hyphen or the like. As described above, when "All Chapters" or the range of the defined chapter is selected, the input to "Page Numbers" by the user is not required.

Procedure of Insertion Position Setting Processing

Next, the following describes a procedure of insertion position setting processing according to the first embodiment with reference to FIG. **17**. FIG. **17** is a flowchart illustrating an example of the procedure of the insertion position setting processing according to the first embodiment. The insertion position setting processing indicates processing when "Insert Position" is designated in the setting image for setting the insertion page illustrated in FIG. **7**.

As illustrated in FIG. **17**, the information processing device **100** determines the designated option of the insertion position "Insert Position" (Step S**501**). If the insertion position is designated with "Input Page Number", the information processing device **100** determines whether the input in the UI of page number "Page Numbers" is performed according to a predetermined format (Step S**502**). At this time, if the input is not correctly performed according to the predetermined format (No at Step S**502**), the information processing device **100** outputs a warning for prompting the user to perform correct input (Step S**503**). On the other hand, if the input is correctly performed according to the predetermined format (Yes at Step S**502**), the information processing device **100** determines the input page number as "i" (Step S**504**). When a plurality of page numbers are designated, the page numbers are determined as "i_1 to i_k".

Subsequently, the information processing device **100** determines whether before or after, regarding "Before or After Pages" (Step S**505**). In this case, if the after "After" is selected, the information processing device **100** determines that the position of the insertion page is after "i_k" (Step S**506**). On the other hand, if the before "Before" is selected, the information processing device **100** determines that the position of the insertion page is before "i_k" (Step S**507**).

If the insertion position is designated as all the chapters "All Chapters", the information processing device **100** determines whether before or after, regarding "Before or

After Pages" (Step S508). At this time, if the before "Before" is selected, the information processing device **100** determines that the position of the insertion page is before "i_k" (Step S507). On the other hand, if the after "After" is selected, the information processing device **100** determines that the position of the insertion page is after "j_k" (Step S509).

If the insertion position is designated as the defined chapter "i–j", the information processing device **100** determines whether before or after, regarding "Before or After Pages" (Step S510). In this case, if the before "Before" is selected, the information processing device **100** determines that the position of the insertion page is before "i_k" (Step S507). On the other hand, if the after "After" is selected, the information processing device **100** determines that the position of the insertion page is after "j_k" (Step S509).

Procedure of Page Range Setting Processing

Next, the following describes a procedure of page range setting processing according to the first embodiment with reference to FIG. **18**. FIG. **18** is a flowchart illustrating an example of the procedure of the page range setting processing according to the first embodiment. The page range setting processing indicates processing when "Page Range" is designated in the setting image for setting the exception page illustrated in FIG. **9**.

As illustrated in FIG. **18**, the information processing device **100** determines the designated option of the page range "Page Range" (Step S601). If the page range is designated with "Input Page Number", the information processing device **100** determines whether the input is performed in the UI of page number "Page Numbers" according to the predetermined format (Step S602). In this case, if the input is not correctly performed according to the predetermined format (No at Step S602), the information processing device **100** outputs a warning for prompting the user to perform the correct input (Step S603). On the other hand, if the input is correctly performed according to the predetermined format (Yes at Step S602), the information processing device **100** applies the setting of exception page to the input page (Step S604).

If the page range is designated as all the chapters "All Chapters", the information processing device **100** applies the setting of exception page to all the chapters (Step S605). If the page range is designated as the defined chapter "i–j", the information processing device **100** applies the setting of exception page to the range of the selected chapter (Step S606).

Effect of First Embodiment

The information processing device **100** reflects the set values of the defined configuration of the chapters in the print setting screen related to the specialized page such as the insertion page or the exception page and receives designation of various print settings, so that the burden on the user can be reduced in print setting. The information processing device **100** displays the print setting screen including the option for designating all the chapters, the option for inputting the page number, and the option for designating each chapter, and receives the designation of various print settings, so that a flexible print setting can be performed according to a situation.

Second Embodiment

The embodiment of the printing system **1** according to the present invention has been described above. Alternatively, various different embodiments can be employed in addition to the above embodiment. A different embodiment will be described regarding a (1) configuration and a (2) computer program.

(1) Configuration

Information including a processing procedure, a control procedure, a specific name, various pieces of data or parameters, and the like described above and illustrated in the drawings can be arbitrarily changed unless specifically noted. The components of the devices illustrated in the drawings are merely conceptual, and it is not required that they are physically configured as illustrated. That is, the specific form of distribution and integration of the devices are not limited to those illustrated in the drawings. All or part thereof may be functionally or physically distributed/integrated in arbitrary units depending on various loads or usage states.

(2) Computer Program

The setting program executed by the information processing device **100** according to one aspect is recorded and provided in a computer-readable recording medium such as a compact disc read only memory (CD-ROM), a flexible disk (FD), a compact disc recordable (CD-R), and a digital versatile disc (DVD), as an installable or executable file. The setting program executed by the information processing device **100** may be stored in a computer connected to a network such as the Internet and provided by being downloaded via the network. Furthermore, the setting program executed by the information processing device **100** may be provided or distributed via a network such as the Internet. The setting program executed by the information processing device **100** may be embedded and provided in a ROM, for example.

The setting program executed by the information processing device **100** has a module configuration including the units described above (the image generation unit **111**, the display control unit **112**, the acquisition unit **114**, and the ticket generation unit **116**). As actual hardware, the CPU (processor) reads and executes the computer program from the storage medium, and each of the units is loaded on the main storage device. Accordingly, the image generation unit **111**, the display control unit **112**, the acquisition unit **114**, and the ticket generation unit **116** are generated on the main storage device.

According to an aspect of the present invention, the burden on the user can be reduced in print setting.

Although the invention has been described with respect to specific embodiments for a complete and clear disclosure, the appended claims are not to be thus limited but are to be construed as embodying all modifications and alternative constructions that may occur to one skilled in the art that fairly fall within the basic teaching herein set forth.

What is claimed is:

1. An information processing device comprising a processor that implements:

an acquisition unit that acquires set values of chapters representing units into which an entire job is arbitrarily divided;

an image generation unit that generates a print setting menu for a user to define print settings for individual pages of the job, wherein the generated print setting menu includes options for defining print settings for designated chapters based on the set values, wherein the print settings designate locations for placing insertion pages within the job;

a display control unit that performs control to display the generated print setting menu on a display unit; and

a ticket generation unit that generates a job ticket designating print settings based on user input applied to the print setting menu displayed on the display unit.

2. The information processing device according to claim **1**, wherein the image generation unit generates the print setting menu including the set values of the chapters as one of the options related to a specialized page.

3. The information processing device according to claim **1**, wherein the image generation unit generates the print setting menu including the set values of the chapters as one of the options related to an insertion page for inserting a new page.

4. The information processing device according to claim **1**, wherein the image generation unit generates the print setting menu including the set values of the chapters as one of the options related to an exception page for designating a page range to which a setting different from a print setting for an entire page is applied.

5. The information processing device according to claim **1**, wherein the image generation unit generates the print setting menu including the set values of the chapters as one of the options related to a tab sheet for utilizing a sheet different from a sheet for an entire page of an original as a partition.

6. The information processing device according to claim **1**, wherein the image generation unit generates the print setting menu including the option for designating all chapters based on the set values of the chapters.

7. The information processing device according to claim **1**, wherein the image generation unit generates the print setting menu including an option for inputting a page number and a text region that enables input when the option is selected.

8. The information processing device according to claim **7**, wherein

when inconsistency is in the input of the page number, the image generation unit generates a warning image representing the inconsistency, and

the display control unit performs control to display the generated warning image on the display unit.

9. The information processing device according to claim **1**, wherein

the acquisition unit stores the acquired set values in a storage unit in association with identification numbers for identifying the chapters, and

the image generation unit generates the print setting menu based on the set values of the chapters corresponding to the identification numbers stored in the storage unit.

10. The information processing device according to claim **1**, wherein the image generation unit generates the print setting menu including the option for designating each chapter based on the set values of the chapters.

11. A print setting method executable by a processor, the method comprising:

acquiring set values of chapters representing units into which an entire job is arbitrarily divided;

generating a print setting menu for a user to define print settings for individual pages of the job, wherein the generated menu includes options for defining print settings on a chapter-by-chapter basis based on the set values, wherein the print settings designate locations for placing insertion pages within the job;

performing control to display the generated print setting menu on a display unit; and

generating a job ticket designating print settings based on user input applied to the print setting menu displayed on the display unit; and

transmitting the job ticket to a control device for processing a print job.

12. A computer program product comprising a non-transitory computer-readable medium containing an information processing program, the program causing a computer to perform:

acquiring set values of chapters representing units into which an entire job is arbitrarily divided;

generating a print setting menu for a user to define print settings for individual pages of the job, wherein the generated menu includes options for defining print settings on a chapter-by-chapter basis based on the set values, wherein the print settings designate locations for placing insertion pages within the job;

performing control to display the generated print setting menu on a display unit; and

generating a job ticket designating print settings based on user input applied to the print setting menu displayed on the display unit.

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